

CLAIMS

What is claimed is:

- 5 sub 1
1. A pultrusion method of producing a composite structural sandwich member having a rigid structural element embedded therein, the method comprising the steps of:
- 10 providing at least one structural element comprising a rigid, pre-rigidized, or rigidizable element;
- aligning a plurality of core elements in a process direction with the structural element disposed between opposed faces of at least two adjacent core elements;
- 15 feeding upper and lower fiber face skins onto outwardly facing surfaces of the aligned plurality of core elements to form a sandwich arrangement; and
- pulling the sandwich arrangement through a pultrusion process comprising:
- 20 wetting out the sandwich arrangement with resin, and
- introducing the sandwich arrangement into a heated pultrusion die to cure the resin.
2. The pultrusion method of claim 1, wherein in the step of providing the structural element, the structural
- 25 element is formed from a fabric, and in the wetting out step, resin is further impregnated into the structural element.
3. The pultrusion method of claim 1, wherein in the
- 30 step of providing the structural element, the structural element comprises a pre-pultruded element.

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4. The pultrusion method of claim 1, wherein in the step of providing the structural element, the structural element comprises a pre-impregnated fiber-reinforced element.

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5. The pultrusion method of claim 1, wherein in the step of providing the structural element, the structural element is channel-shaped, I-shaped, H-shaped, T-shaped, Z-shaped, C-shaped, or box-shaped in cross-section.

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6. The pultrusion method of claim 1, wherein in the step of providing the structural element, the structural element is hollow in cross-section.

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7. The pultrusion method of claim 1, wherein the structural element comprises a fabric material, and in the aligning step, the fabric material is wrapped over a portion of at least one core element.

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8. The pultrusion method of claim 1, wherein the structural element is disposed between the adjacent core elements in a plane perpendicular to the direction of travel in the pultrusion process.

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9. The pultrusion method of claim 1, wherein the structural element is disposed horizontally between the adjacent core elements in a plane parallel to the direction of travel in the pultrusion process.

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10. The pultrusion method of claim 1, wherein the structural element is disposed vertically between the adjacent core elements in a plane parallel to the direction of travel in the pultrusion process.

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11. The pultrusion method of claim 1, wherein the structural element is disposed in a predetermined location to provide a hard point within the sandwich arrangement.

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12. The pultrusion method of claim 1, wherein the structural element is disposed between opposed faces of a plurality of adjacent core elements.

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13. The pultrusion method of claim 1, further comprising disposing a plurality of structural elements between opposed faces of a corresponding plurality of two adjacent core elements;

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14. The pultrusion method of claim 1, wherein the pultrusion process further comprises heating the sandwich arrangement downstream of the pultrusion die to further cure the resin.

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15. The pultrusion method of claim 1, wherein in the wetting out step, resin is impregnated into the upper and lower fiber face skins.

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16. The pultrusion method of claim 1, wherein in the aligning step, the core elements comprise a homogeneous material.

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wetting out the upper and lower fiber face skins and the reinforcing stitching with resin, and introducing the sandwich arrangement into a heated pultrusion die to cure the resin.

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20. The method of claim 19, wherein in the providing step, the reinforcing stitching extends diagonally through the thickness of the at least core element.
- 5 21. The method of claim 19, wherein in the providing step, the reinforcing stitching extends perpendicularly through the thickness of the at least core element.
- 10 22. A method for embedding a composite, fiber-reinforced, resin-matrix structural element into a composite structural member in a pultrusion process, comprising:
- arranging a plurality of pultruded rods into a bundle;
- 15 feeding a plurality of layers of a fiber reinforcing material over the pultruded rods;
- forming the layers into a form of the composite structural member, the form having a least one bend in a portion of the layers, with the bundle of pultruded rods embedded within the layers at the bend; and
- 20 pulling the structural member through a pultrusion process comprising:
- wetting out the plurality of layers with resin,
- and
- 25 introducing the structural member into a heated pultrusion die to cure the resin.
23. A composite structural member form by the method of claim 22.

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